Biosafety Components

SNL Biosecurity Team

National Workshop on Biosecurity

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NNSA National Nuclear Security Administration

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Biosafety Level 1

- **Suitable for work involving well-characterized agents not known to cause disease in healthy adult humans and of minimal potential hazard to laboratory personnel and the environment.**
- **Examples:**
  - ***Bacillus subtilis***
  - ***Naegleria gruberi***
  - **Infectious canine hepatitis virus**
  - ***E. coli***

Biosafety Level 1: Facility Design

- **Requirements:**
  - **Laboratories have doors**
  - **Sink for hand washing**
  - **Work surfaces easily cleaned**
  - **Bench tops are impervious to water**
  - **Sturdy furniture**
  - **Windows fitted with flyscreens**

Easily cleaned and decontaminated

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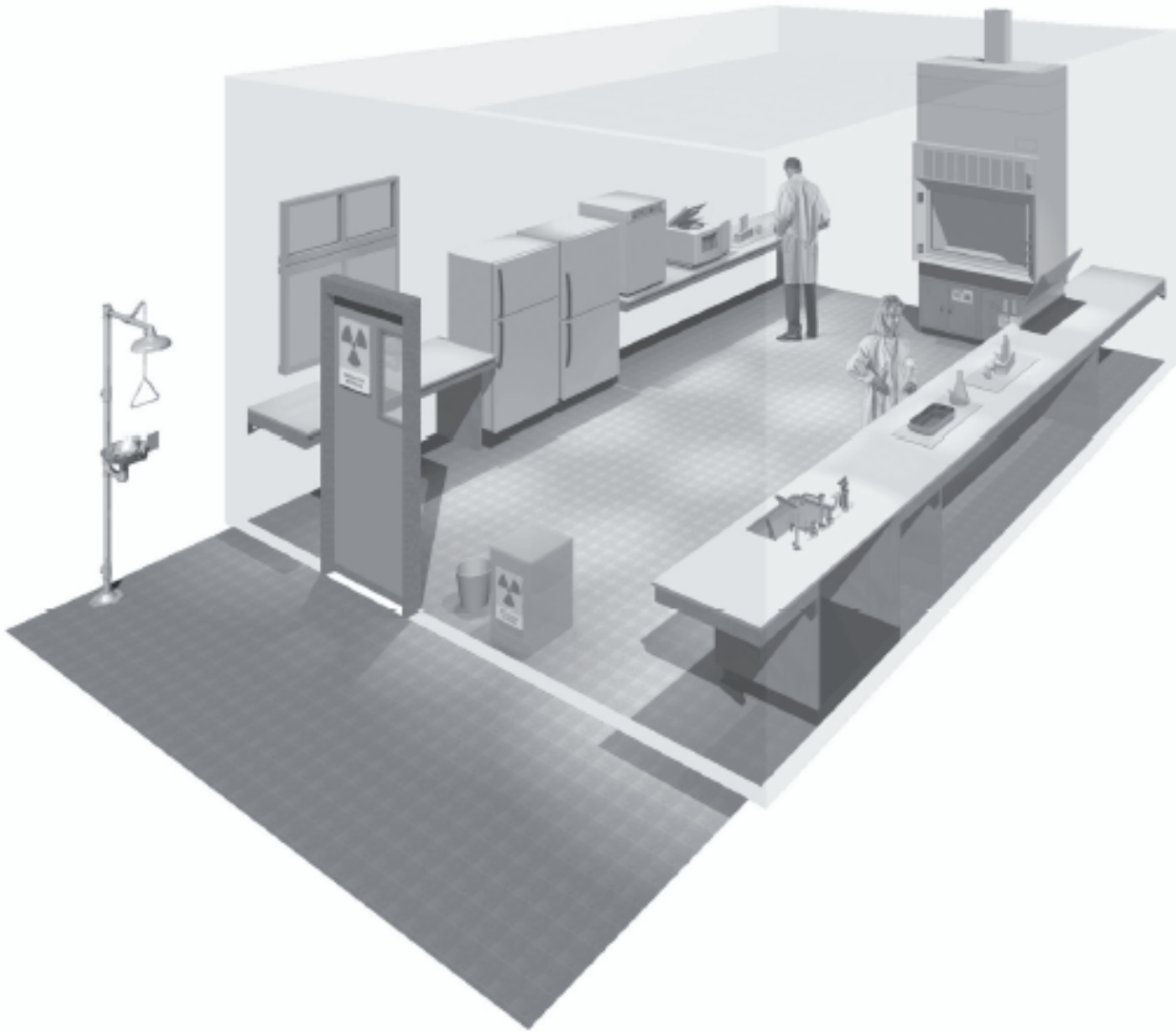
Biosafety Level 1: Facility Design



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Biosafety Level 2

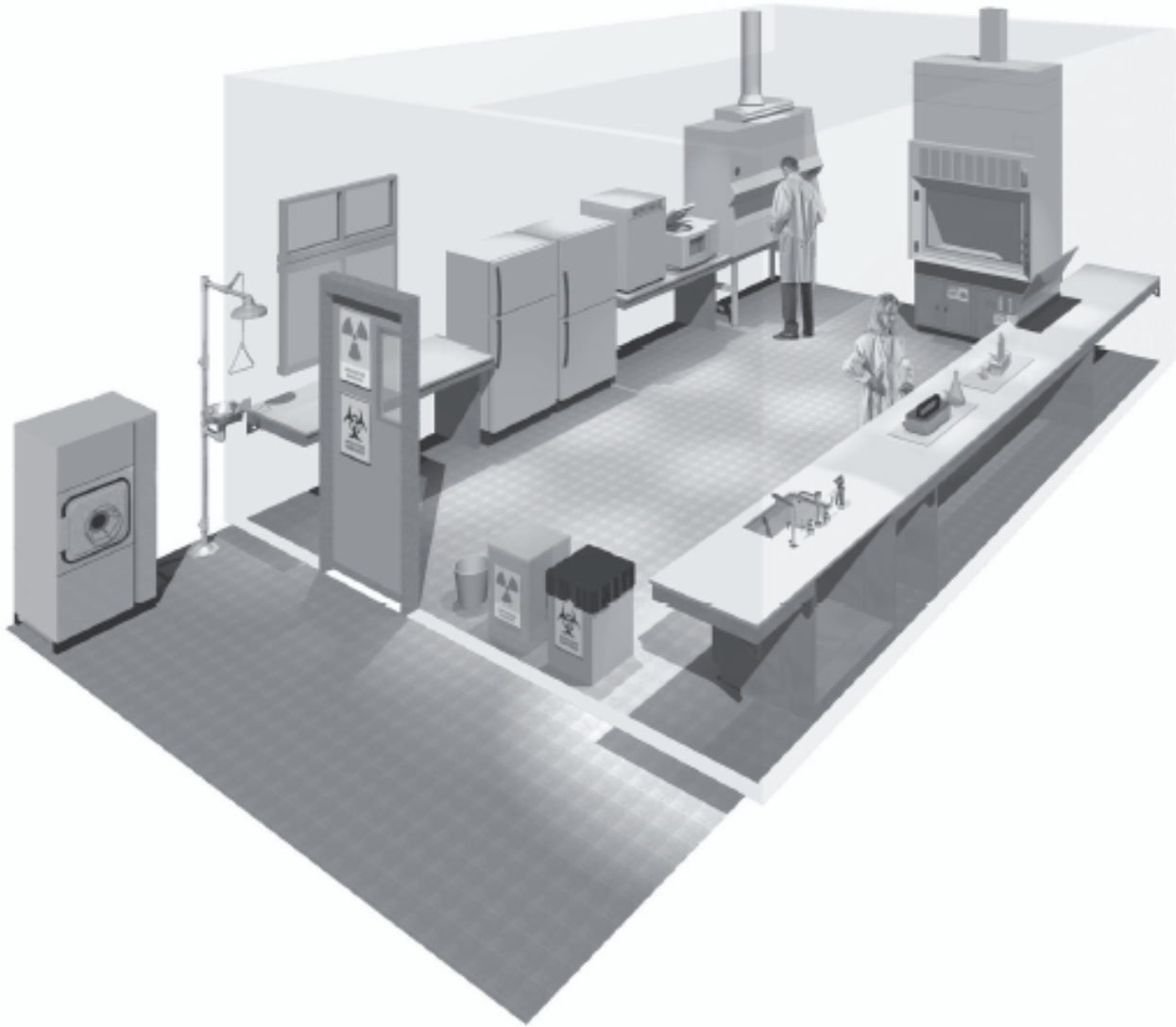
- **Suitable for work involving agents of moderate potential hazard to personnel and the environment**
- **Examples:**
  - **Measles virus**
  - **Salmonellae**
  - **Toxoplasma species**
  - **Hepatitis B virus**

Biosafety Level 2: Facility Design

Restricted access
when work in progress

- **Requirements:**
  - **Laboratories have lockable doors**
  - **Sink for hand washing**
  - **Work surfaces easily cleaned**
  - **Bench tops are impervious to water**
  - **Sturdy furniture**
  - **Biological safety cabinets installed as needed**
  - **Adequate illumination**
  - **Eyewash readily available**
  - **Windows fitted with flyscreens**
  - **Location - separated from public areas**
  - **Ventilation – directional**
    - **Air flows into lab without re-circulation to non-lab areas**

Biosafety Level 2: Facility Design



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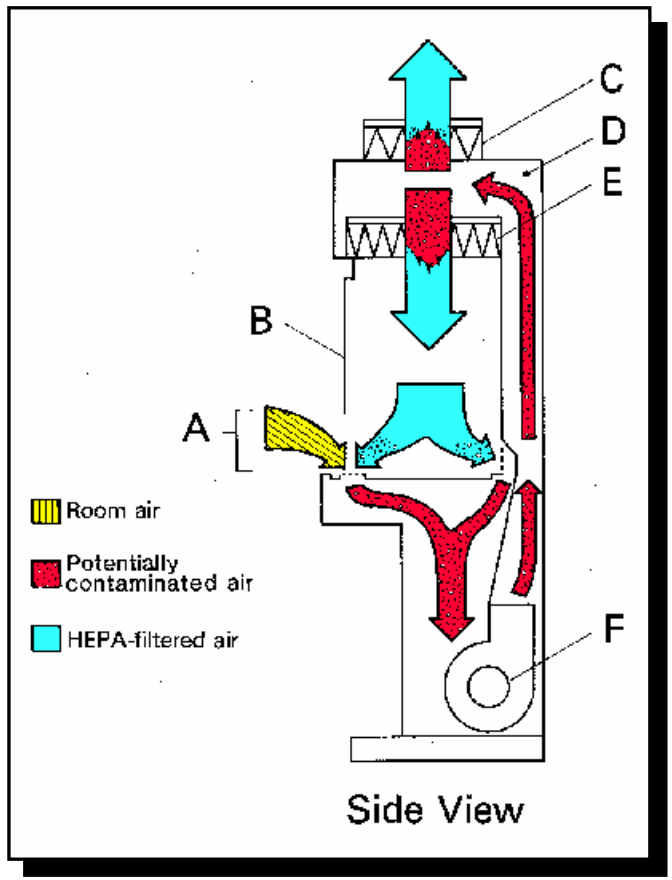
Biosafety Level 3

- **Suitable for work with infectious agents which may cause serious or potentially lethal disease as a result of exposure by the inhalation route.**
- **Examples:**
  - ***Mycobacterium tuberculosis***
  - **St. Louis encephalitis virus**
  - ***Coxiella burnetii***

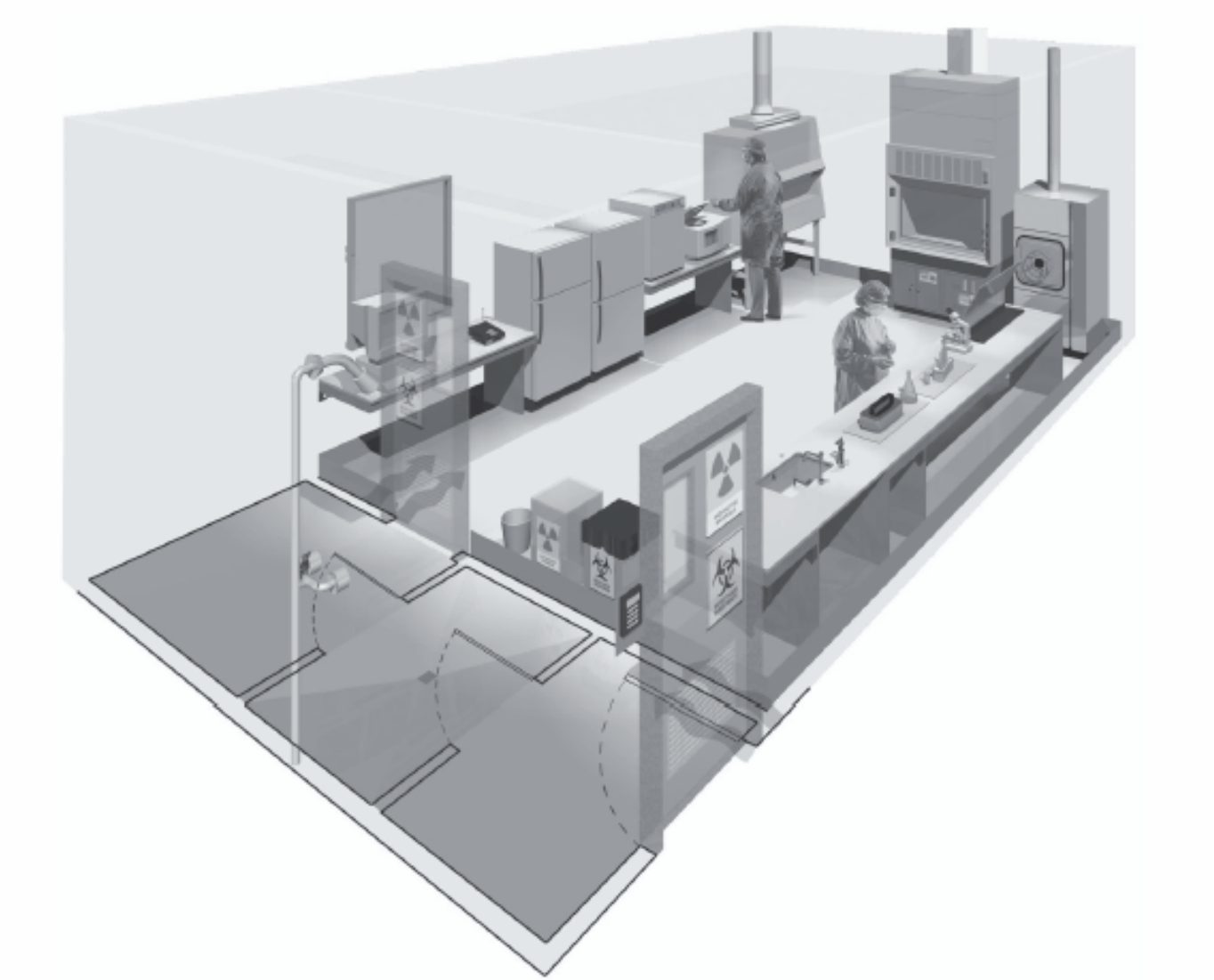
Biosafety Level 3: Facility Design

- **Requirements:**
  - **BSL-1 and 2 Facilities PLUS**
    - **Enclosures for aerosol generating equipment**
    - **Room penetrations sealed**
    - **Walls, floors and ceilings are water resistant for easy cleaning**
    - **BSC class II or III to manipulate infectious material**



Respiratory protection may be appropriate

Biosafety Level 3: Facility Design



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Summary of Biosafety Level Requirements

Table 3. ***Summary of biosafety level requirements***

	BIOSAFETY LEVEL			
	1	**2**	**3**	**4**
Isolation[a] of laboratory	No	No	Yes	Yes
Room sealable for decontamination	No	No	Yes	Yes
Ventilation:				
— inward airflow	No	Desirable	Yes	Yes
— controlled ventilating system	No	Desirable	Yes	Yes
— HEPA-filtered air exhaust	No	No	Yes/No[b]	Yes
Double-door entry	No	No	Yes	Yes
Airlock	No	No	No	Yes
Airlock with shower	No	No	No	Yes
Anteroom	No	No	Yes	—
Anteroom with shower	No	No	Yes/No[c]	No
Effluent treatment	No	No	Yes/No[c]	Yes
Autoclave:				
— on site	No	Desirable	Yes	Yes
— in laboratory room	No	No	Desirable	Yes
— double-ended	No	No	Desirable	Yes
Biological safety cabinets	No	Desirable	Yes	Yes
Personnel safety monitoring capability[d]	No	No	Desirable	Yes

[a] Environmental and functional isolation from general traffic.
[b] Dependent on location of exhaust (see Chapter 4).
[c] Dependent on agent(s) used in the laboratory.
[d] For example, window, closed-circuit television, two-way communication.

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